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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/927,069	08/09/2001	Ralph E. Sipple	RA-5415	4934

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EXAMINER

INOA, MIDYS

ART UNIT	PAPER NUMBER
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2188

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DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/927,069

Applicant(s)

SIPPLE ET AL.

Examiner

Midys Inoa

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

A Letter of Non-Compliance under 37 CFR 1.121 was mailed on February 22nd, 2002 regarding the amendment filed on January 16th, 2002. No response was received. Please note that since the applicant did not supply a correction to the preliminary amendment, examination on the merits has commenced without entry of the preliminary amendment.

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on January 16th, 2002 has been considered by the examiner.

Drawings

2. The drawings filed on October 9th, 2001 have been accepted by the examiner.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Line 1 of the claim recites the limitations "said requested lock" and "said extant lock"; there is no prior mention of these limitations in Claim 7 or in Claim 5 (which it depends from). There is insufficient antecedent basis for these limitations in the claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-2, 4-5, and 9-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Lambright et al. (6,457,102).

Regarding Claim 1, Lambright discloses a method of handling software locks where software locks inquiries are handled in two ways, a first conventional lock handling process (hardware lock) and a second process for handling communal software locks (software locks), wherein said second process handles inquiries from inquirers (lock requests, Column 3, lines 50-59) and comprises: i) determining by a communal lock processor associated with a particular mid-level cache whether a lock inquiry from an inquirer is for a communal software lock or for a conventional lock (Column 5, lines 1-15), ii) processing said communal software lock inquiry if said determination determines that the inquiry is for a communal software lock, else allowing a conventional lock process to process said conventional lock. The determining step occurs when the processor first obtains a conventional hardware lock to prevent others from accessing software locks and once it has **determined** that this task was successful, then a software lock is acquired and the hardware lock is released. Furthermore, when software lock is to be acquired, the processor processes its software lock request in order to acquire it; otherwise, if the hardware lock was not successful it remains holding the software lock ("allowing a conventional lock process").

Regarding Claim 2, Lambright discloses the method of handling software locks of Claim 1, where step i) further comprises (a) determining if said lock request is from another mid-level cache, and if so, processing said lock request as a communal software lock request (Column 5,

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line 59- Column 6, line 11), or (b) determining if said lock request is from an instruction processor associated with said mid-level cache, and if so, determining if said lock request is for a communal software lock by reference to a mapping of all available communal software locks, and if so, performing step ii) ("reference to a mapping", Column 5, lines 34-45 and Column 2, lines 9-29). The determining step takes place once again when it is recognized that a cache block has been modified and so, the appropriate block within the cache's LRU must be modified. This recognition is part of the determination that a software lock must be acquired in the LRU in order for that particular block to be modified. Once the modification is complete, the software lock is released.

Regarding Claim 4, Lambright discloses the method of handling software locks of Claim 1, where step ii) comprises determining if the communal software lock is mapped to the cache, and if not, sending a request for said communal software lock to a mapped cache owning said communal software lock, but if the communal software lock is mapped to the cache, determining if the communal software lock is present in said cache, if not, requesting a cache line for said lock (Column 5, lines 34-45).

Regarding Claim 5, Lambright discloses communications taking place through conventional channels (See Figures 1-4B). There is no mention of special channels being used.

Regarding Claims 9-11, Lambright discloses establishing a track i.d. table (mapping of communal software locks) containing the addresses of the locks and mapping them to their location, either in a cache or in the cache's LRU (Column 5, lines 34-45).

Regarding Claim 12, Lambright discloses a method of handling software locks where software locks inquiries are handled in two ways, a first conventional lock handling process

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(hardware lock) and a second process for handling communal software locks (software locks), wherein said second process handles inquiries from inquirers (lock requests, Column 3, lines 50-59) and comprises: i) determining by a communal lock processor associated with a particular mid-level cache whether a lock inquiry from an inquirer is for a communal software lock ("high contention lock") or for a conventional lock (Column 5, lines 1-15), ii) processing said communal software lock inquiry if said determination determines that the inquiry is for a communal software lock, else allowing a conventional lock process to process said conventional lock. The determining step occurs when the processor first obtains a conventional hardware lock to prevent others from accessing software locks and once it has **determined** that this task was successful, then a software lock is acquired and the hardware lock is released. Furthermore, when software lock is to be acquired, the processor processes its software lock request in order to acquire it; otherwise, if the hardware lock was not successful it remains holding the software lock ("allowing a conventional lock process"). Lambright discloses establishing a track id table (mapping, "assigning each high contention lock...", "setting up a system for holding said assignments") containing the addresses of the locks and mapping them to their location, either in a cache or in the cache's LRU (Column 5, lines 34-45).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3, and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lambright et al. (6,457,102) in view of Beukema et al. (2002/0161955).

Regarding Claim 3, Lambright teaches the invention as set forth by claim 2 above. Lambright does not disclose determining if an inquiry is a status report request and if so, sending the information to the inquirer. Beukma et al. discloses upon receiving an access request, determining locking status information and returning such information to the requestor (see Claim 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the status request of Beukma et al. to the system of Lambright et al. in order to allow the requesting processor to know if the lock requested is available so that in the event of an unsuccessful lock request, it can remedy the situation by requesting another lock.

Regarding Claim 13, Lambright discloses a set of memory blocks 51-55 which make up an LRU within a cache, which are connected to each other in a radial configuration (see Figure 3) thus allowing for the transfer of information pertaining to locks. Lambright does not teach setting or reporting on a set condition by sending signals to a requesting processor. Beukma et al. discloses upon receiving an access request, determining locking status information and returning such information to the requestor (see Claim 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the status request of Beukma et al. to the system of Lambright et al. in order to allow the requesting processor to know if the lock requested is available so that in the event of an unsuccessful lock request, it can remedy the situation by requesting another lock.

Regarding Claim 14, Lambright discloses the method for handling communal locks where a mapping assigns software locks to a particular cache or location, and wherein each

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software lock request checks the mapping so as to direct said software lock request to an appropriate one of said particular ones of said caches or locations (Column 5, lines 34-45).

Regarding Claim 15, Lambright discloses the method where if the cache does not have the requested lock information when the request is received, the information is requested and the lock is processed (Column 5, lines 34-45).

9. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lambright et al. (6,457,102) in view of Chauvel (2002/0069328).

Regarding Claim 6, Lambright discloses the invention as set forth by claim 4 above. Lambright does not teach making a determination whether a requested lock value passed in the communal software lock inquiry is a same value as an extant value, which is in said communal software lock located in the cache. Chauvel discloses determining if a task id of the request matches the task id at the TLB location ("cache", paragraphs 139-142). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the task id comparison of Chauvel in the invention of Lambright et al. in order to provide further authorization confirmation prior to performing the requested lock.

Regarding Claims 7-8, Chauvel discloses that if the matching of the task ids is successful, the lock request is processed, thus the locking is successful. If the matching of the tasks ids is not successful, the lock request is denied, thus it is unsuccessful. It is understood that in processing or not processing the lock, the requestor is informed of whether the matching was a success or not. Furthermore, it would have been obvious to change the task id value once a comparison operation is made so that a requestor who was previously successful still has to go

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through the task id verification even though it knows the previously used task id. This adds more protection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Midys Inoa whose telephone number is (703) 305-7850. The examiner can normally be reached on M-F 7:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (703) 306-2903. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Midys Inoa
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Examiner
Art Unit 2188

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3/22/04

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TC 21W